Maine Compost Initiative 2004

2001 Composting Seafood Processing Residuals

1999 Composting Leaves and Yard Trimmings

Residual Food Recycling

Maine Department of Environmental Protection,
Bureau of Remediation and Waste Management

Maine State Planning Office,
Waste Management and Recycling Program

Maine

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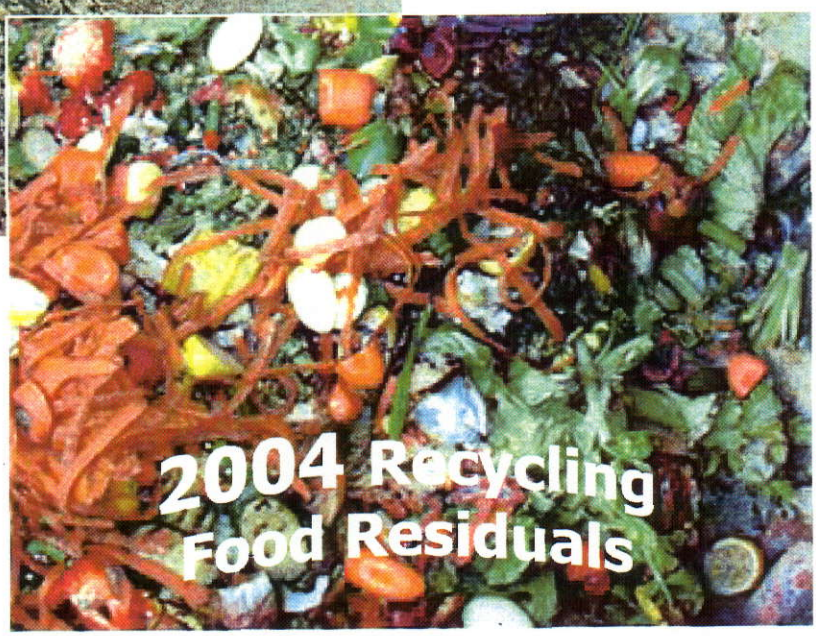

**Maine Department of Environmental Protection,
Bureau of Remediation and Waste Management**

**Maine State Planning Office,
Waste Management and Recycling Program**

Table of Contents

Chapter I: Introduction.

Chapter II: The Compost Process.

Chapter III: The Regulations.

Chapter IV: Making Compost.

Chapter V: Trouble shooting the Compost Process.

Chapter VI: Your Community and other Challenges.

Chapter VII: Marketing.

Appendix.

I. Introduction

The Maine Compost Initiative seeks to develop Maine's first integrated food waste residuals management program using the intrinsic values represented in the state's longstanding waste management hierarchy. The program goal is to support the collection of food waste residuals generated by large and small scale generators (supermarkets, restaurants, and institutions) and distribute those materials within the community according to the food's highest and best value.

1. Waste Reduction; Food for People:
food that is of highest quality should collect and distributed through local food banks.
2. Waste Reuse; Food for Animals:
food that is of good quality, but not suitable for human consumption should be collected for pick up by local farmers.
3. Waste Recycling; Food for Plants:
food that is not suitable as food should be collected and processed through composting and vermi-composting into value added soil amendments.

Each of these program components complements one another forming a food waste residuals management hierarchy. This powerful diversion strategy will capture the greatest value in food waste residuals from an environmental, social, and cost-effective standpoint.
The Initiative seeks to establish a network of support for and by generators, processors, and consumers of diverted materials in order to overcome challenges and sustain a program that is cost effective, with both economic and environmental benefits and that can be applied throughout the state.

Since the early 1990's, Maine has been working steadily towards a waste recycling goal of 50 percent. We have been, for the most part very successful regarding inorganic waste products (i.e. bulky and non-bulky wastes). We have not been so lucky with organic waste products. Food wastes, aka, "source separated organics" (SSO) comprise the largest remaining challenge to and point of opportunity for reaching the 50% mark.

There are two significant hurdles that must be overcome before we will see successful utilization of this waste stream. First, up to this point and time, there has been no coordinated effort in Maine to promote and support education regarding proper separation and storage of food waste and the reasons for putting such a program in place. Secondly, generators, waste haulers, and receiving facilities are reluctant to handle separated food wastes due to the relative putrescible nature of this material, often leading to odor and leachate issues.

To address this, one must first understand exactly what comprises the organic waste stream.

Organic materials fall into two (2) sub-categories: pre-consumer residuals and post-consumer residuals. Note: both categories may also include various types of paper products. Pre-consumer food wastes are food residuals from left-over from meal preparation and grocery store "pick overs". Generally, pre-consumer products have not been cooked or processed except for initial packaging.

Post-consumer food residuals are any leftover, uneaten food that has already been served. In general, pre-consumer food residuals are more easily composted because it is fairly simple to train kitchen employees about proper separation techniques. Post-consumer food composting may require additional monitoring by trained staff to reduce the risk of contamination.

Keeping things simple at first, such as beginning with pre-consumer composting, allows you to establish a successful collection system more easily. Continuous employee/consumer education, getting employees/consumers to "buy into the system," and monitoring will help, as will color coded bins and appropriate signage. Once employees have been trained, minimal extra time is required to separate materials because it becomes part of the normal daily routine.

One way to estimate the amount of waste generated is to measure all of the residuals produced in each area during a typical operation week and project this amount over time. For example, if you have several stores or cafeterias, measure one typical container of food residuals and multiply this amount by the number of containers collected. Make sure employees are informed, and containers contain food residuals only. Normally, disposal costs are billed by the cubic yard (a volume measurement). Therefore, measure food waste in the same unit of measurement as trash disposal. Standard container sizes and their volume capacity include: 5- gallon container - .025 cubic yards30-gallon container - .15 cubic yards55-gallon container - .27 cubic yards (National Solid Waste Management Association, 1985).

Volume-to-weight conversions for food waste vary considerably, depending on the type of food and its moisture content. If trash disposal at your institution is measured and billed by the ton, a standard container filled with representative samples of your institution's food waste should be filled, then weighed for an approximate conversion between volume and weight.

If you are considering an on-site composting program (where the proper mix of feedstocks is important), measure the amount of each type of food going into your compost. By doing this, you will be able to properly gauge your compost mixture. The compost mixture is important for moisture, PH, and porosity, which are essential factors in the compost process.

Determining whether food waste composting is right for your institution requires a fairly thorough assessment of your institution's waste generation and disposal practices. Most successful composting programs are usually individually structured to meet the financial and operational opportunities and constraints of a given institution.

Regardless, food composting provides a low tech, cost-effective option, which transforms a "waste" product into a beneficial soil amendment that is stable and odor free. However, composting food residuals requires diligent management to prevent problems with odors, leachate and animal (vector) attraction. Chapter 5 "Troubleshooting the Compost Process" deals specifically with these and other nuisance issues.

Currently, 19 facilities compost food residuals in Maine. The feedstocks composted include: food scraps (meat and produce), fin fish cuttings (herring, dog fish, ground fish); shell fish (clams, scallops, mussels and whelks); and, crustaceans (lobsters, crabs and sea urchins). Each of these residuals poses a unique set of challenges.

All of Maine's compost facilities receive tipping fees which range from $20 to $30 dollars per ton on average. Maine's landfills currently charge $58 to $70 per ton. Even with the cost of trucking added, composting usually ends up being a better deal for most food waste generator food waste generators.

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Food waste Composting Challenges

Even with its economic advantages, the process of siting, developing and managing a compost facility can be a very arduous experience. Food waste processors and compost facility operators have different needs and requirements that must be considered prior to setting up a compost site. Food waste processors operate on a limited budget and often have little or no on-site storage capacity.
This creates an immediate problem, as food waste residuals by nature, tend to be highly putrescible and odorous due to a low carbon to nitrogen ratio (<15:1) and low solids content (10% to 30%). As a result, this residual tends to break down quickly, creating odor and leachate issues, necessitating the need for regular removal.
The compost site must be relatively close to the processing facility, as trucking food waste residuals long distances can be cost prohibitive.

Therefore, compost facilities must be adequately sized to handle incoming waste streams and properly designed to facilitate flow of materials throughout the compost process. The compost facility must also have adequate amounts of carbon amendment on site to mix with incoming loads of food waste at proper, pre-determined compost recipes. This initial mixing helps to control leachate, prevent odors and initialize the compost process.

Most of Maine's compost facilities depend on tipping fees to help establish and maintain their sites. This arrangement works well provided that compost facility operators accept

only the volume of waste that the facility can handle. However, facility operators often accept more product than they can process in the hopes of expanding their sites with the added revenue. Invariably, this "short circuits" the compost process leading to numerous nuisance problems including: odors, leachate, and animal (vector) attraction.

Once a facility begins this downward spiral it is often difficult to recover. Additionally, compost facilities need to establish operating hours and access control to prevent unauthorized deliveries, especially on weekends when facility personnel are not available to properly process incoming loads. Dust, noise, and traffic can also add to volatile problems.

Why do choose composting?

1. Lower Costs
Composting is a relatively inexpensive management method as compared to the cost of disposing the same materials at either landfills or incinerators. In addition, managing food waste waste through composting benefits us all by extending the limited life of in-state landfills, and by making the best use of expensive in -state incinerator capacity and technology.

2. Environmental Benefits
Diverting food waste processing residuals to composting sites reduces the potential for water and air pollution from landfills, and reduces air emissions that contribute to green house gas levels, residue, and incinerator ash that must be landfilled as a special waste. The use of compost can improve soil quality, reduce water consumption in the landscape, and reduce non-point source pollution from the overuse of chemical fertilizers.

3. Improve public relations and education
Informing and educating citizens to the benefits of a properly managed and promoted community compost program is a readily accessible demonstration of "waste to resources" that positively engages the residents and businesses with tangible benefits back to the community.

4. Make a useful and desirable commodity
Composting turns waste materials into a valuable end product. Citizens, local businesses and public works departments can be both the suppliers of additional carbon and nitrogen feed stocks, and the end users of the compost.

Why start now?

1. Composting has proven a track record throughout the State
While there is ongoing research to improve methods of composting and to expand the uses of compost, composting has been part of the Maine waste management scene for more than a decade. Composting has been promoted at the state level through a

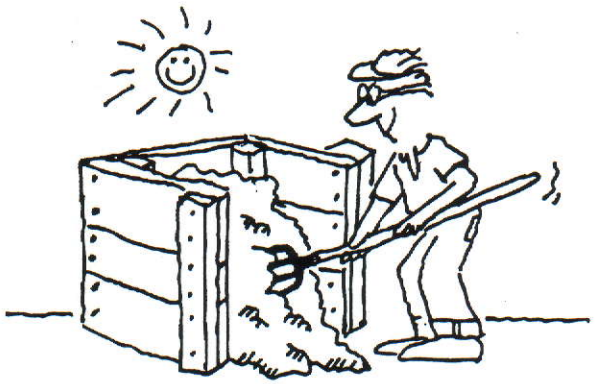
variety of grant programs that funded master composting training, home composting education and equipment, pilot and demonstration projects and community level leaf and yard trimming composting operations.

2. Composting has encouraging standing in regulation

In November of 1998, The Maine Department of Environmental Protection published the new Solid Waste Management Rules and Regulations. These provide a clear and consistent framework for environmentally sound compost operations.

3. Ready access to good technical assistance

In addition to knowledgeable staff at the Maine D.E.P and State Planning Office, Maine is home to two nationally known resources on composting: the **Compost Team** and the **Compost School**. Both programs are cooperative efforts by the Departments of Environmental Protection and Agriculture, the Maine State Planning Office, the Cooperative Extension Service of the University of Maine, and the University of Maine at Orono.



II. The Compost Process

Composting is a biological process in which microorganisms consume organic materials (carbon and nitrogen compounds) and convert them into a nutrient-rich, humus-like product. Although composting can occur without oxygen, the composting presented in this guide is an aerobic process, meaning that the microorganisms require oxygen to live.

In order for the microbes to survive and multiply within a compost pile, in addition to oxygen, there must be suitable amounts of carbon, nitrogen, and moisture. The moisture serves as the medium in which the microorganisms live, the carbon provides the energy/food source to fuel them, and the nitrogen provides the building blocks for their reproduction. The composting process begins when the appropriate ratios of materials have been mixed together. The physical process of mixing usually provides enough oxygen to initiate the composting.

During the "active composting phase," the microorganisms consume a great deal of oxygen as they feed on the available organic matter. At the same time, they are producing heat, water vapor, and carbon dioxide as they consume and reduce the original volume and mass of the raw ingredients.

A "curing phase" usually follows the active phase. During curing, the microorganisms still feed, but at a slower pace, giving off lower amounts of heat, water vapor, and carbon dioxide. Left undisturbed, the microorganisms will continue to feed until all the organic matter has been consumed. The final product is a nutrient rich soil amendment that provides many benefits including: increased organic matter, enhanced soil structure, drainage and porosity, and water holding capacity. Because of these qualities, compost is a valuable end product for the local home gardener and landscape companies.

A. Four common composting techniques used in Maine

Over the years, many composting systems have been developed and employed in Maine to facilitate the composting process. Today, though, there are 4 fundamental composting systems in use: the static pile, the aerated static pile, the turned windrow, and the in - vessel system.

1. **The Static Pile.** Lisbon Transfer and Recycling Facility

The static pile method involves mixing the compost ingredients together and constructing a pile from the blended material. Subsequent turnings may not be required.

Advantages:

- The least labor/equipment intensive method.
- The preferred method for composting leaves.
- The only equipment needed is a tractor with a bucket or a front end loader(or a very strong back!)
- The pile may be turned up to 4 times a year but will usually compost without any further management.

Drawbacks:

- The composting usually happens very slowly due to the steady reduction in the amount of oxygen available throughout the pile.

Wilton Residuals Compost Facility

2. Aerated Static Pile. This system involves building a static pile on top of an aeration system, either passive (usually pipes with holes) or forced air, and then leaving the material without subsequent turning until the active phase of the compost process is completed. However, during this phase air is passively drawn or forced through the pile with fans or blowers.

Advantages:

- This low tech approach requires very little capital investment or accessory equipment and as a result, has been widely used for manure and municipal sewage residual composting efforts.

Drawbacks:

- Because there can be no mechanical turning of the pile once it is placed on the aeration system, a thorough mix of all materials must be achieved at the outset of the pile formation. Care must be taken to achieve a homogenous blend.
- Care must be taken in the layout of the aeration system to allow for the free exchange of air or else odors may occur.
- There must be careful monitoring of the airflow, temperature, and moisture content of these piles as they are prone to excessive drying, that can result in a slow down of the activity of the microbes.

Land & Sea Compost, Rockport

3. Turned Windrow System. This is the preferred method for most on-farm and seafood composting activities. It would work equally well for municipal operations with sufficient space and resources.
Typically, leaves and yard trimmings are placed down in layers in long piles (windrows) and mixed using a mechanical windrow turner. Windrows are then turned as needed with the same windrow turner. A front end loader can be substituted to mix and turn the windrows though care must be taken to achieve a good level of mixing. A front end loader will require more time than a windrow turner.

Advantages:

- The windrow system requires the least amount of time for the composting to occur and allows for a large volume of material to be turned in a short length of time.
- Each subsequent turn further blends the compost ingredients, releases trapped carbon dioxide and water vapor, redistributes air spaces within the row, and also aides in the physical breakdown of the materials. This results in a very uniform product.

Drawbacks:

- This method requires more intensive management and more space than the static pile/ aerated pile methods.
- Pile temperature must be carefully monitored so that the row will be turned at the appropriate time to ensure successful composting.
- Windrow turning machines can be costly investments.

Green Mountain Systems

4.

In-Vessel System. As the name denotes, in - vessel composting occurs within a closed system. Usually this means within a building or a container. All of the receiving, mixing, and composting activities are enclosed, and exhaust gases are collected and processed through a filter. Any leachate generated during composting is collected and recirculated back into the process.
Most in - vessel systems combine forced air and a form of mechanical mixing or agitation.

Advantages:

- The immediate benefit of in-vessel systems is the rapid production of a well decomposed product without any concern for odors or leachate generation.

Drawbacks:

- The initial capital investment can be prohibitive.
- Such systems use complex machinery which requires a high level of technical expertise to operate and maintain.

III. The Regulations

"In Maine, food residuals composting activities are regulated under the provisions of Maine Solid Waste Regulations, Chapter 409, "Processing Facilities", and Section 9- *Reduced Procedure for Select Compost Facilities*. Each Activity requires a permit which may be obtained through any of the Department of Environmental Protection's Regional offices (a complete reference list of Department licensing staff phone numbers and regional office locations appears at the end of this document). **The following section lists the minimum siting and operating standards as excerpted from Chapter 409, Section 9:**

"A. Applicability. This section applies to compost facilities that choose to follow the siting, design and operational standards in this section and compost the following residuals:

(1) Any amount of type IA residuals; and/or

(2) Up to 400 yds^3 monthly of type IB residuals; and/or

(3) Up to 200 yds^3 monthly of type IC residuals; or up to 200 yds^3 monthly of type II residuals.

NOTE: See Chapter 400, section 1 for a full definition of residual types. Type IA residuals are leaf, vegetative and other residuals with a C:N ratio of greater than 25:1. Type IB residuals are food and other residuals with a C:N ratio of between 25:1 to 15:1. Type IC residuals are fish and other residuals with a C:N ratio of less than 15:1. C:N refers to the ratio of available carbon to nitrogen of the raw residual prior to composting. See appendix 409.A for a list of typical C:N ratios for various residuals. The lower the initial C:N the higher the potential for generation of nuisance odors. Type II residuals are sewage sludge, septage, and other residuals that may contain human pathogens. Type III residuals are petroleum contaminated soils and other residuals that may contain hazardous substances above risk based standards in Chapter 418, appendix A.

If these conditions are not met, or if the applicant chooses to site, design or operate the facility in a manner that would not meet the standards of this section, then the applicant must submit a formal application to the Department for a license to develop and operate the compost facility under sections 2-3. Facilities licensed under this section are subject to the operating standards in section 4.

B. Reduced Procedure Siting and Design Standards. In addition to the general siting and design standards contained in section 2, all compost facilities licensed under this section must comply with the following standards:

(1) Working surface: mixing, composting, curing, storing or otherwise handing residuals, and compost at the facility must be on surfaces meeting one of the following standards:

(a) On soils that a Maine certified soil scientist has determined are moderately well drained to well drained, as classified by the Natural Resources Conservation Service, and that are at least 24 inches above the water table, bedrock, and sand or gravel deposits.

(b) On a pad that is constructed a minimum of 2 feet above the seasonal high water table and is either composed of:

(i) a minimum of 18 inches of soil material having between 15 and 35% fines, covered with a minimal 6 inch drainage layer of compacted gravel; or

(ii) soil covered with asphalt or concrete.

(c) Alternative surface: on a surface determined by a soil scientist, soil engineer or other qualified individual as being suitable for the proposed activity, taking into account the other aspects of the facility design, such as a roofed structure or in vessel system. An applicant must arrange a pre-application meeting with the Department if proposing an alternative surface under this section.

(2) Pad: At facilities handling type IC residuals, the applicant must construct a receiving and mixing pad covered with asphalt, concrete, or other impervious material. For facilities processing type II residuals, or more than 750 cubic yards of type IC residuals annually, the applicant must construct a pad covered with asphalt, concrete, or other impervious material for the entire waste handling area, excluding the storage area for compost having a dewars stability class of 4 or greater.

(3) Storm Water and Leachate Control: Surface water drainage must be diverted away from receiving, processing, composting, curing, and storage areas. The facility must also be designed to manage run-off and leachate to prevent contamination of groundwater or surface water. Water falling on the facility during a storm of an intensity up to a 25-year, 24 hour storm event must infiltrate or be detained such that the storm water rate of flow from the facility after construction does not exceed the rate prior to construction. The facility design must include provisions to contain, collect and treat any leachate generated at the facility.

(4) Slopes: Surfaces on which composting takes place must slope between 2% and 6%, and where necessary, be graded to prevent ponding of water.

C. **Operating Requirements.** In addition to the operating requirements of section 4, all compost facilities licensed under this section are subject to the following additional operating requirements. Except for facilities subject to section 8.A(2)(b), facilities licensed under the permit-by-rule provisions of former Chapter 567, section C-2.a (effective December 23, 1989) and whose licenses were in effect on November 2, 1998 are also subject to the operating requirements of section 4, and the following additional operating requirements:

(1) Pad Inspection: All soil surfaces that are used for residuals mixing and composting must annually be graded clean and re-compacted. All concrete and asphalt pads must annually be scraped clean and inspected for cracks or other deformities, and repaired as needed. The operator must maintain the minimum 2 foot separation to bedrock, groundwater and sand or gravel deposits.

(2) Odor Control: The facility must be operated to prevent nuisance odors at occupied buildings. The facility must:

(a) Operate and maintain the odor control system approved by the Department;

(b) Receive incoming putrescible residuals on a pile of sawdust or other sorbent, high carbon compost amendment;

(c) Contain and treat process air or cover odorous piles with a layer of finished compost or other suitable compost amendment;

(d) Properly aerate piles such that composting is aerobic throughout the pile;

(e) Blend materials to achieve a homogenous mix throughout the pile; and

(f) Alter the compost recipe as needed to alleviate odorous emissions.

(3) Pathogen treatment and vector attraction reduction: Type IC and Type II residuals must be composted to achieve a Class A Pathogen Reduction and Class A Vector Attraction Reduction in accordance with Chapter 419 , Part B-1.d, unless otherwise approved in the facility's utilization license issued under Chapter 419 or Chapter 567. To attain these standards by composting, all of the following standards must be met:

(a) Pathogen Reduction: Through the process of composting, each particle of residual is maintained at 55 degrees Celsius or higher for three consecutive days. For windrow systems, this standard is presumed to be met if the residual is maintained at operating conditions of 55 degrees Celsius or higher for 15 days or longer, and during the period when the compost is maintained at 55 degrees or higher, there is a minimum of five turnings of the compost pile.

(b) Vector Attraction Reduction: Residual must be treated by an aerobic composting process for 14 days or longer. During that time, the temperature of the residual must be higher than 40 degrees Celsius and the average temperature of the residual must be higher than 45 degrees Celsius.

(c) Analytical Standard: The density of *Salmonella sp.* bacteria in the finished compost must be less than three Most Probable Number per four grams of total solids (dry weight basis). In the absence of analytical data on *Salmonella sp.* this standard is presumed to have been met when the density of fecal coliform in the finished compost is shown to be less than 1000 Most Probable Number per gram of total solids (dry weight basis). This analytical standard must be met at the time the compost is utilized.

(4) Static Pile composting: The following additional standards apply to composting type IC or type II residuals using the static pile method:

(a) the static piles must be aerated during the active composting stage;

(b) detention time in the static aerated pile must be at least 21 days;

(c) unless an auger, tub grinder hammer mill, or other Departmentally approved mixer is used to mix the initial ingredients for the pile, the pile must be broken down half way through the active compost process and reformed.

(d) the pile must be maintained with an insulating blanket of at least 12 inches of finished compost, sawdust, or other material as approved by the Department during the active compost phase to maintain temperatures throughout the pile and control odors.

(5) Stability: Residuals that have completed the active composting phase must also be cured until the equivalent of a dewar's stability class of IV or greater is achieved, unless otherwise approved in the facility's utilization license issued under Chapter 419.

(6) An operations log must be kept at the facility and made available for Department review during normal business hours containing the following:

(a) source and volume of residual received on a daily basis;

(b) date of individual pile construction and breakdown;

(c) pile composition (mixture recipe);

(d) date and time of turning or otherwise aerating;

(e) process monitoring data;

(f) date the pile is put into curing and the date it is taken out of curing; and

(g) date, time and type of samples obtained from the facility

(7) The facility may not receive more than the volumes in section 9.A.

(8) Residuals must be handled on approved surfaces. Type IC and type II residuals must be offloaded and mixed on a receiving pad meeting the standards in section 9.B(2).

D. **Application Requirements.** The applicant shall submit to the Department, on forms developed by the Department, information sufficient to meet the standards and submissions requirements of Chapter 400, section 4 and the application requirements of section 3 of this Chapter. For outdoor compost facilities, instead of the subsurface investigation information required by section 3.H, the applicant may submit a report from a Maine Certified Soil Scientist or other qualified individual that either:

(1) Verifies that the waste handling areas for the proposed facility are on soils that are moderately well drained to well drained, as classified by the Natural Resources

INTRODUCTION TO CH.4
MAKING FOOD WASTE COMPOST

FIRST STEPS: Food Residual Collection and Transport

Once the site has passed initial inspection by the DEP, it is time to begin setting it up. The first consideration involves establishing an appropriate food residual collection system.
Fundamentally, the collection system should address three (3) major components: materials collection and packaging at the generating facility, pick-up and transport to the receiving facility, and finally, receipt and handling of incoming residuals.

The collection system is a critical component to any food waste-composting program. The system for separating compostable's at the source and transporting the materials to a vehicle collection point should be as convenient as possible. The primary objectives of the collective system are to:

- Maximize the capture rate of compostable materials;
- Eliminate non-organic contaminants such as plastic wraps, rubber bands, glass, and metal, and
- Minimize labor and space requirements.

Collection systems within different businesses will vary according to the specific needs of each business, space limitations, and general layout of work areas. In grocery stores and food service institutions, for example, collection containers can be placed at workstations in the produce, deli, bakery, and dairy departments. In cafeterias, containers can be placed near tray and silverware recovery stations if collecting plate residuals, and in the kitchen where preparation residuals are generated.

- In any case, containers should be conveniently located at points of generation and clearly labeled.

Remember to place a trash container next to the composting container to help prevent contamination. Plastic garbage containers are well suited for holding food residuals, and can easily be placed in areas where residuals are generated. Container size will vary, depending on the amount and type of compostable material generated and the amount of space available within the facility. Food waste can be heavy, especially when wet. Make sure you consider safe lifting limits when choosing containers. Clearly marked containers, such as green for food, blue for recyclables, and brown for trash, are helpful for proper participation.

In preparation areas,

- Training of personnel is essential to good composting.

Employees are normally required to properly separate pre-consumer materials in food preparation areas and, if post-consumer materials are composted, in collection and wash areas as well. Frequent cleaning is recommended to eliminate odors. Some businesses prefer to use liners in collection containers. Compostable bags are typically more expensive than disposable plastic bags but can be composted along with their contents. Non-compostable bags, while less expensive, require the extra step of emptying the bags' contents at the compost site. Because "de-bagging" can be very labor-intensive, compostable bags are often preferable. Sources of compostable bags are listed in the Resources section of this Guide.

Just as trash hauling needs to be prompt and reliable in order to avoid health and safety problems, so too does food waste hauling. Some institutional generators of food residuals have found it easier and more economical to do the hauling themselves. Others contract with private waste haulers to collect and deliver the materials to a permitted composting site. In either case, try to optimize vehicle capacity and collection frequency. If the vehicle is too small, excessive transportation costs may result from traveling to the compost facility too often. Conversely, small loads in a large vehicle may not warrant use of the equipment.

- The goal is to match food waste generation and collection frequency with the right-size vehicles.

When done properly, problems are prevented and transportation costs are kept to the minimum. You may also wish to consider implementing a "Back Haul". When using a back haul, the generating facility delivers a load of food residuals to the compost facility and hauls back a load of finished compost for resale. This allows the truck to haul product both ways thereby reducing the transportation costs.
Once you have set-up your collection program, it is time to focus on developing your compost site.

IV. MAKING COMPOST

A. Setting Up

Once the site has passed initial inspection by the DEP, it is time to begin setting it up. The first consideration involves determining how large a footprint you will need to handle the volumes that you project. Remember, it is a lot easier to fill vacant space than it is to create more space at an already cramped site!

Determining the footprint is generally accomplished by developing a site-layout plan. (See Appendix H for a sample site-layout plan.)

A site layout plan should sub-divide the compost area into designated handling areas, list facility design features, and facilitate materials flow through the process. It will show you how many times the same material will have to be handled and the how long it will take up space in the different management areas on the site.

The following section describes a typical site-layout plan; an illustration depicting this site-layout immediately follows:

- Receiving and Handling Area: Allows for the coordinated delivery and handling of in-coming feedstocks. Problem residuals may be isolated here. Provides operators with their first chance to control odors through good residual management (i.e., receiving putrescible materials, such as manure, on a bed of sawdust or leaves to help absorb leachate) and immediate mixing of seafood processing residuals with carbonaceous amendment .

- Amendment Storage Area: Allows delivery and stockpiling of carbonaceous amendment, free from contamination with other feedstock.

- Mixing Area: Allows pre-determined, measured amounts of feedstocks to be accurately and thoroughly mixed, while also providing for odor and leachate control. A thorough, heterogeneous mixture facilitates initiation of the active compost phase.

- Composting Area: This is the point where active composting begins. This is generally the largest portion of the site and should be located central to the receiving/handling and mixing areas.

- Curing Area: This area is designed for aging and final maturation of compost piles that have completed the active compost phase. Curing is an essential step in the completion of the compost process, allowing natural progression and die-off of microbial populations.

Waste Bypass Area: Provides a centralized area for collection and storage of "non-compostables" for later disposal. Rejected loads of residuals may be staged here while waiting for pick-up. Common contaminants may include:

- Road grit and sand;
- Litter, coffee cups and lunch bags;
- Rocks, roots, and dirt;
- Large branches, and waste wood;
- Plastic bags, plant containers, and flower pots.

B. THE WORKING SURFACE

Upon determining the footprint of the compost area, you will need to develop a suitable work surface. A flat surface with a 2 to 4% grade allows surface precipitation to quickly move off the pad, which prevents ponding. There has been much discussion regarding the benefits/need of an asphalt or concrete pad over a traditional compact gravel or soil-based pad. Proponents of the asphalt pad claim that it provides an impervious barrier, preventing leachate movement to groundwater. In addition, asphalt and concrete pads are very durable and can withstand years of use with very little maintenance. Soil and gravel pads, on the other hand, are prone to leachate infiltration and associated rutting, needing to be scraped and resurfaced on a yearly basis. For leaf and yard trimming composting, a compacted gravel pad is adequate, as very little leachate is usually generated as a result of composting these feedstocks. However, if you are considering co-composting your leaf and yard trimmings with manure or food discards, you may wish to consider investing in an asphalt or concrete pad to avoid future leachate issues.

Compost facility design should include provisions for site drainage. Every attempt should be made to divert surface run-on (clean water) away from the compost area. This can usually be accomplished using upslope diversion ditches or berms. In areas where surrounding water sheds are significant, stone-lined waterways and catch basins may be employed to intercept and channel surface water. Compost piles may be protected from precipitation by using pile coverings such as polar fleece to help shed excess water. Roofing over the compost operation is an option if the very high cost can be justified by the scale and goals of the program.

Runoff from the compost pad may be intercepted and treated by placing a vegetated "level lip spreader"on the downslope edge of the composting surface (Check with your county Natural Resources Conservation Service office for advice on design and placement of level lip spreaders, or refer to the technical assistance list at the end of this document.)

Facility access roads should also be designed and constructed with site drainage considerations in mind. Run-on from surrounding slopes can be diverted from the compost site simply by constructing a perimeter road perpendicular to the surrounding slopes.

C. SITE OPERATIONS AND MANAGEMENT

The general operations of a compost facility can be broken down into six separate steps:

- recipe development;
- feedstock preparation;
- mixing and pile formation;
- turning;
- curing.

1. RECIPE DEVELOPMENT

The first step to beginning any compost effort is to determine what feedstocks are available for use and at what ratios they should be blended together. The easiest way to accomplish this is to develop a compost recipe. As a general rule, for leaf and yard trimmings, a recipe of three parts leaves to one part grass clippings will yield satisfactory results. If manure is added to the mixture, at least two additional parts leaves should be added for each part manure.

Taking recipe development further:
In a more detailed and comprehensive approach, each compost feedstock is representatively sampled and sent to a testing laboratory to be analyzed for:

- %moisture,
- total nitrogen,
- ammonia,
- total carbon,
- volatile solids,
- bulk density,
- pH.

A final mixture (recipe), which optimizes the chances for aerobic, thermophilic composting (sustained temperatures greater than 131 degrees Fahrenheit) is developed.
In order for microbial colonization to occur, a recipe must contain appropriate amounts of carbon (microbial energy source), nitrogen (provides building blocks for microbial replication) and moisture (the medium that the microbes live in). In addition, there must be enough coarseness to the ingredients to promote natural diffusion of air throughout the final mixture. Otherwise, anaerobic conditions producing odors will occur. The following conditions must be met, within the recipe, in order for optimal composting conditions to occur:

- moisture-50 to 60%,
- Carbon to Nitrogen Ratio (C:N)-20:1 to 30:1,
- pH 6.5 to 7.5,
- Bulk Density <1,000 lbs./cubic yard and
- volatile solids >40% dry weight basis.

For assistance in developing individual recipes, please refer to the technical assistance reference list that appears at the end of this document.

2. FEEDSTOCK PREPARATION OPTIONS

Once you have determined your compost recipe, you should consider preparing the feedstocks for the mixing process. The amount of time you invest in initial feedstock preparation directly affects the rate at which your materials will compost. Your goal is to create a feedstock that can be handled easily but will decompose quickly. The first processing step usually involves material sizing through grinding. Grinding feedstocks prior to mixing increases available surface area for microbial contact, provides for a better mixture among ingredients and helps to speed decomposition by initiating the physical breakdown of ingredients. The purchase or lease of a grinder can be a costly investment, but grinding services can be hired in Maine on a per day basis. The charge for this service usually consists of the cost of transportation, set up, and the grinding. Grinding should be considered when making up the facility's operations budget.

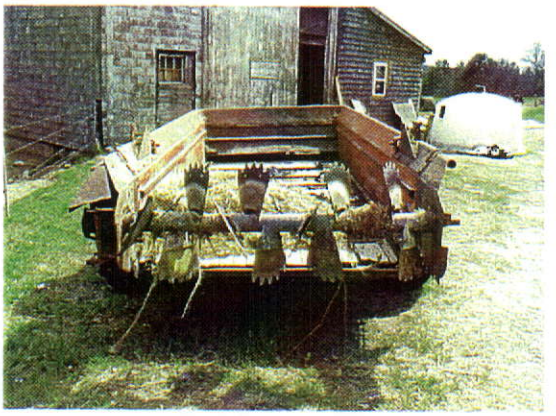
Tub grinder, Glowood Farm, Yarmouth

Once the feedstocks have been properly sized, the next consideration is moisture management. Ideally, a feedstock should contain approximately 50% to 60% water. Adding water to a dry feedstock will help optimize conditions for microbial colonization, whereas adding dry material to a saturated pile helps to create additional air spaces for pile oxygenation. To address this issue, your facility should have a water supply contingency plan, or if possible, have water directly available on site so that feedstocks and compost piles may be irrigated if necessary.

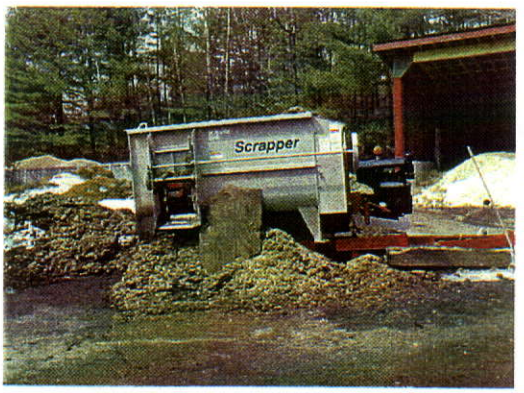
3. MIXING AND PILE FORMATION

a. Mixing. Next to recipe development, proper mixing is the single most important step determining success or failure of the compost operation. Obtaining a thorough, homogeneous mixture at the onset of the compost process, will ensure intimate contact between the carbon, nitrogen and moisture components of the pile, thereby reducing the potential for the formation of "dead spots". In addition, proper mixing allows for even air distribution throughout the pile, helping to promote aerobic composting.

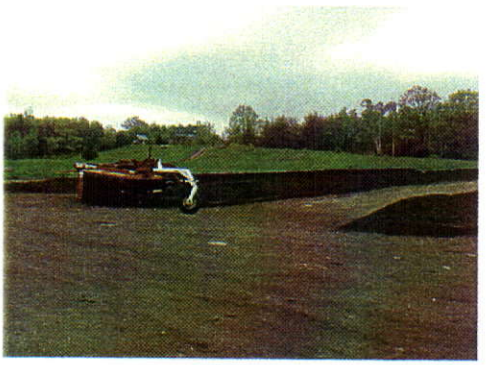
Front End Loader, Boothbay District



Manure Spreader, Lee Farm, Edgecomb



Mixer-Wilton Compost Facility



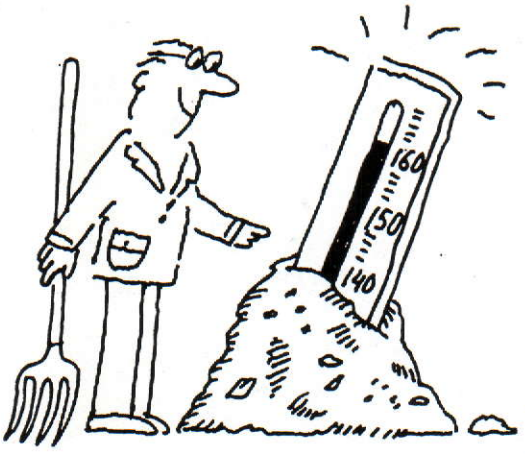
Windrow Turner, Land & Sea Compost, Rockport

Mixing can be accomplished by using: front-end loaders, manure spreaders or other farm equipment, batch or continuous mixers, and windrow turners. Regardless of the method chosen, the objective is to obtain as thorough a mix as possible to help hasten the onset of the active composting phase.

b. Pile Formation. The objective here is to create a pile large enough to sustain the "self-heating" process that accompanies active, thermophilic (requiring high temperature) composting. As a general rule, piles should be constructed at least five to six feet high by eight to 15 feet in diameter. In areas experiencing long winter seasons, pile dimensions may need to be increased to 10 feet high by 15 to 18 feet in diameter. The size and shape of the compost pile will ultimately be determined by the type of compost system that you choose and the volume of material you will be handling in a given season. In addition to adequate mass, the pile must also contain enough porosity (air spaces) to allow natural movement of air throughout the pile. Creating piles that are too high (in excess of 10 feet) risks compression of the inner core contents due to the excessive weight of the overlying materials.

4. TURNING

Turning is the physical process by which compost pile ingredients are blended and re-mixed throughout the active compost phase to help sustain thermophilic temperatures. During the turning process, compacted, settled materials are "fluffed-up", creating air spaces. The act of turning accomplishes several things at once, including: re-mixing of pile ingredients, further physical breakdown of resistant ingredients, and redistribution of air spaces within the pile to help promote passive air flow. In addition, the turning process can be used as a moisture management tool. Piles that are too wet can be turned more often to facilitate drying, whereas piles that are too dry may be turned immediately following precipitation events to help capture and retain moisture. In addition, flattening the top of a pile prior to an anticipated rain event increases the amount of surface area available to absorb moisture.
The frequency of turning depends upon the individual needs of each compost pile.



The easiest way to track the performance of your pile and determine the need for subsequent turnings, is to take and record daily pile temperatures.
To accomplish this, two readings should be taken for each sampling site, one reading at one foot within the pile and the other at three feet or the pile core itself. These readings should be compared, and compost piles should be turned whenever the difference

exceeds 20 degrees. By following this plan, declining temperature trends may be caught and corrected through turning, before pile temperature crashes occur. As a rule of thumb, piles should also be turned whenever there is a significant drop in temperature that cannot be accounted for by an external cause (i.e., 100 year storm event), when active composting temperatures exceed 150 degrees Fahrenheit, or when significant odor production suggests pile imbalances. Piles should not be turned so frequently that the compost process is interrupted and not allowed to reach the optimum temperature.

Wildcat Turner, Windham Corrections Facility

5. CURING

Once the compost mixture has completed the active compost phase, it must undergo a sustained period of curing. Curing is an important, and often forgotten, phase of the compost process. During curing, microorganisms continue the process of organic matter degradation (concentrating on organic acids, large particles, resistant compounds and other particles remaining after the active compost phase), but at a much slower, limited rate. Oxygen consumption, heat generation, carbon dioxide and water vapor evolution are all decreased as the material "matures".

Curing is also essential in readying your product for market. Prolonged curing can make up for compost process shortcomings while also preventing the inadvertent distribution of an immature product. An immature compost product can potentially damage plant root systems due to the presence of volatile organic acids, high C:N ratios, high salt contents, or simply by competing with soil microbes or plant roots for available oxygen reserves.

Once you have a reasonably mature product, you may wish to begin immediate distribution. Some facilities opt to screen the finished compost as a final processing step. Screening improves product quality by removing contaminants and other large, uncomposted particles from the finished product. Screening provides a uniform product

that is aesthetically pleasing and therefore, has increased value. The costs involved, including capital investment and extra labor, often deter facility managers from choosing this option. In fact, if you take the time to properly inspect the feedstocks, removing contaminants prior to mixing, the screening step will often not be necessary. Regardless, whether to screen or not is an individual decision dictated by the needs of your community and consumers of the compost product.

V. TROUBLE SHOOTING THE COMPOST PROCESS

No matter how well you operate your facility you are invariably going to experience nuisance problems from time to time. Nuisance problems are the number one complaint about compost facilities. Engineering and technology to correct these problems can be expensive and ineffectual. The key to remember is that these are "people problems" and that prolonged nuisance conditions can lead to facility shutdown. Complaints should be met with an immediate response, including an explanation of the cause, if known. Good siting can help avoid potential nuisances by ensuring that you have adequate buffers to neighboring residences. Remember, many people "smell" with their eyes. Valleys and gullies should be avoided whenever possible, as they can carry nuisance odors to neighboring residences. Access roads should be located away from residences, maximizing the use of existing visual screens (tree buffers). However, there is no substitute for proper site management. Most problems are often interrelated and as a result, addressing one usually solves the others. The key to overcoming nuisance problems is to identify the "root" cause and correcting it. **The trick to remember is that most compost problems can be avoided simply by optimizing the compost recipe (40-60% moisture, 6.5-7.5 pH, 20:1 to 30:1 C:N, homogeneous mixture, and adequate "air spaces" within the piles) at the onset of composting.**

The following section describes the most common nuisance problems associated with seafood compost facilities and methods that have been developed to correct them. A condensed Trouble Shooting table immediately follows this section.

Odors: Odors signify a breakdown in the compost process. Left uncorrected, odors can drift off site impacting neighboring residences. Odor issues can be addressed by paying strict attention to process control. Incoming loads of seafood residuals should be immediately mixed with carbon amendment as soon as they are received. This is the first chance to control odors. If this is not possible, materials should be received in waterproof, airtight containers until they can be processed. Initial compost recipes should be thoroughly mixed, and the following parameters should be optimized: C:N (25:1 to 30:1), porosity (adequate air space distribution) and % moisture (45% to 60%). Finally, compost piles may also be covered with a 10 to 15 centimeter layer of sawdust, peat or finished compost to act as an odor scrubber.

Vectors: Vectors are organisms capable of transmitting diseases to humans. These organisms include birds (sea gulls and crows), mammals (rats and other rodents) and flies. They are attracted to odorous, decaying materials, especially pieces of marine organisms that have not been properly incorporated into compost piles. Vectors can be discouraged by maintaining a neat and clean operation. Grinding seafood residuals also allows for better compatibility with amendments during mixing; making the waste

products less odorous and therefore, less attractive. In addition, thoroughly cleaning empty storage vessels also reduces attractiveness to vectors.

Leachate: Leachate results from poor moisture management during initial recipe formation and/or from prolonged exposure of compost windrows to heavy precipitation. As mentioned above, initial compost recipes should have a moisture content of 45 to 60%. Because leachate contains concentrated nutrients, it poses a significant threat to groundwater. In addition, if your piles are losing nutrients than your finished compost will be poorer in quality. There are several approaches to leachate management. The first is to prevent it. Leachate can be avoided by achieving proper mix ratios at the onset of composting. Additionally, composting under a roofed structure or by using water resistant covering materials can help minimize the effects of precipitation on leachate generation. Most Maine facilities try to capture the leachate by amending it with sawdust or other suitable materials and then re-incorporating it back into the compost piles. Other facilities collect the leachate into a storage tank and then reuse it on the piles when moisture adjustments are necessary. Finally, leachate may be discharged onto a level vegetated surface for treatment. The key to leachate control is to manage moisture in the initial recipe development.

Dust, Noise and Traffic: All of these problems are often interrelated. Dust is created as a result of many compost facility operations including: materials off-loading, mixing, compost turning, screening and traffic. Dust conditions can also be exacerbated by prevailing winds, carrying particles onto neighboring properties. On site, dust can be an irritant to facility workers affecting the eyes and respiratory tract. Noise from compost equipment such as front-end loaders, grinders, mixers, transport trucks and compost turners can annoy neighbors directly abutting your facility. Increased traffic results in noise, dust, excessive speeds and bottlenecks. These issues can be addressed by developing daily operating hours, monitoring equipment noise, setting speed limits on access roads and soliciting feedback from your neighbors. In addition, dust conditions can be minimized by moistening dry compost piles and enclosing screening, mixing and turning operations.

PROBLEM	CAUSE	SOLUTION
Piles fail to heat	Pile too wet or too dry	Adjust moisture to 40-60%
	pH too low or too high	Adjust pH to 6.5-7.5
	Mix is not uniform	Breakdown and re-mix piles; grind ingredients to make compatible
	Particle size is too small	Add "bulking" source to pile to increase porosity
	C:N too high	Adjust C:N to 20:1 - 30:1
	Pile mass too small	Combine piles to increase mass
"Uneven" compost temperatures	Mix is not uniform; particle size mismatch	Breakdown and re-mix piles; grind ingredients to make compatible
Odor Production		
Ammonia	pH too high (>8.5)	Lower pH to 7.5
	Pile too dry	Raise pile moisture to 40%
	Too much nitrogen in recipe	Add carbon source until C:N is between 20:1 and 30:1
"Pungent-Rotting Smell"	pH too low (<5.5)	Raise pH up to 6.5
	Pile too moist	Dry pile down to 60% moisture
	Poor Pile Porosity	Re-mix pile to increase porosity and/or add more bulking agents
Failure to produce a stabilized finished product	Compost pile has not completed active compost phase	Re-mix pile, adjust recipe and allow to continue composting until active phase has been completed
	Inadequate "curing" time	Allow pile to cure for additional time-up to 6 months if necessary

VI. Your Community and Other Challenges

Fostering and maintaining good relations with the community surrounding your compost site begins before the production of any compost and should be part of the operations plan developed prior to start up.

A. YOUR STRATEGY:

- Take advantage of local media and use local public forums, such as Kiwanis, Lions and Rotary clubs to promote what you want to do.
- Talk about composting and compost; demonstrate your knowledge of the uses and applications of compost.
- Briefly describe the operations with a focus on the quality control.
- Detail a plan for getting this information out to potential local users: including municipal public works departments or road crews, public garden and landscape projects, school departments, general contractors, loam production contractors, private homeowners and local landscape contractors.
- You should also consider having the compost tested for its soil amendment value and to ensure the material poses no threat to plants or humans.
- Be up front and answer people's questions and concerns. Address such potential issues as odor, noise, and environmental safeguards.
- Consider sponsoring a backyard home composting workshop to familiarize residents with the process and its benefits.
- Look for opportunities to donate compost to local projects. Such actions will create good will and advertise your product.

Boothbay Regional Refuse Disposal District

B. COMPOSTING IN MAINE

Operating a compost facility in Maine can offer many challenges to the beginning facility manager. Seasonal fluctuations in weather conditions as well as seasonal availability of feedstocks requires preplanning and site preparedness. In the spring, heavy rains can saturate piles, halting compost activity, while rendering access roads impassable. Likewise, sudden winter storms can paralyze a facility by freezing compost piles and halting compost activities.The key is to develop and stick with a successful operating plan that accounts for these weather factors.

C. WINTER COMPOSTING

Maine winters are notorious for being long and cold. Accumulations of snow and ice, coupled with extended periods of subzero temperatures, can spell disaster for outdoor (exposed) facilities if caught unprepared. Excessive snow must be removed and access ways kept open to allow continued facility operations. Cold temperatures slow the

compost process by increasing the amount of heat lost by the compost pile. As this continues, pile microorganisms slow down their metabolic activity, further exaggerating the heat loss, which may result in complete halting of compost activity.

Prior to the onset of colder weather, composting piles may be combined to increase mass (to retain heat) and prevent freeze-ups. As a general rule, finished piles should be at least five feet high by 10 feet wide to assure enough mass to sustain thermophilic temperatures throughout the winter season. Piles (windrows) may also be covered with a commercially available pile cover. The covers, manufactured from a wide variety of materials, help insulate compost piles by preventing heat loss and cold infiltration. In addition, the covers shed water further protecting the pile's surface from freezing. Even if the piles do freeze, it is important to remember that this is only a temporary condition and that the compost process will take off again once the piles thaw.

Spring composting provides additional challenges to facility operators. Periods of heavy rains and slow ground thawing may result in pad rutting and site accessibility issues. This problem can be avoided by designing and constructing an impervious composting surface as well as planning for durable year-round access during the site selection and development phase.

D. SEASONAL AVAILABILITY OF FEEDSTOCKS

Many composting feedstocks are available on a seasonal basis. Leaves, for example, are collected primarily in the fall and to a lesser degree during spring clean up. They must be composted in large quantities. Facilities must develop contingency plans to make allowances for this sudden influx. Seasonal feedstocks will require additional storage as well as adequate space for their immediate processing. Some facilities may wish to compost on a "seasonal basis", operating only when the feedstocks are available. This method works well for small communities who save a portion of space at the local transfer station to handle incoming leaves in the fall.

VII.MARKETING YOUR FINISHED PRODUCT

Once your compost has completed the both active composting and curing, it is time to consider marketing. How and where you decide to sell your product will depend on a whole variety of factors including: determination of product quality (through maturity testing and nutrient analysis) and suitable end uses, location of potential markets, transportation costs, advertising costs, and packaging and labeling costs (if you choose to bag your product). The most important factor is to adequately test and characterize your product so that it may be used beneficially.

An important use of compost in the agricultural industry is as a soil amendment for eroded farmland. Farmers in the United States are becoming concerned about the reduction of organic matter in soil and are aware that maintaining healthy land depends on this. Agricultural use of compost remains low because the product is weighty and bulky, which can make transportation expensive and some agricultural users have concerns regarding potential amounts of heavy metals and other possible contaminants in compost. The potential for contamination becomes an important issue when compost is used on food. If the compost is applied well before planting, this concern is decreased immensely. Encouraging farmers to use compost reduces erosion and improves water quality.

The landscaping industry is another potential outlet for compost. A majority of composters in the United States are currently selling their compost to landscapers. Landscapers use compost as a soil amendment, in outdoor growing mixes, in topsoil, and in turf establishment and maintenance. Other uses for compost are in maintenance of lawns and parks, highway landscaping, sod production, athletic field maintenance, renovation, and construction. For some of these uses, landscapers require premium compost, which means that the product should have minimal odor, particle sizes of no greater than 1/2inch in diameter, less than 50 percent moisture content, and no plant or human pathogens. The landscaping industry also requires that the materials used in its projects meet the specifications of the landscape architect or inspector. Since landscapers also have expressed concern about the possible presence of potentially toxic compounds in municipal solid waste (MSW) compost, tests should be conducted on the final compost product and the results made available to potential users.

The horticultural industry is one of the largest potential markets for compost of uniform consistent high quality. Compost is attractive to the horticultural industry because it is a source of organic matter and essential trace plant nutrients, increases the water-holding capacity of soil, improves the texture of soil, and enhances a soil's ability to suppress plant diseases. The use of compost in potting mixtures and in seedling beds has helped to reduce the need to apply soil fungicides in the production of certain horticultural crops.

Silviculture or forestry applications are a potentially large market for compost. Four segments of this market present viable opportunities: forest regeneration, nurseries,

Christmas tree production, and established forest stands. Regenerating forests represents the largest potential market for compost in a silvicultural area. One long-term study, in which MSW compost was applied during forest planting, determined that MSW compost did provide forest growth ad-vantages while causing no detectable problems. Forest nurseries and Christmas tree production represent potentially low-volume/high-value applications of compost. Compost uses applicable to the public sector include land restoration, parks and re-development, weed abatement on public lands, roadway maintenance, and median strip landscaping.

One final word, 'vermi-composting"

Vermi-composting utilizes worms to break down a variety of organic materials, including food residuals. Initially, bedding is prepared, using moist paper, wood chips or other bulking agents. Then the food residuals are mixed into the bedding. Worms added to the bedding work their way through the pile, digesting both the decomposing organic matter and the microorganisms that are also engaged in the decomposition process.

As the worms digest the material, they excrete castings, a quality soil amendment rich in minerals and nutrients. There is no need to turn the piles; the worms provide natural aeration, although some degree of porosity is initially required. Once the worms have worked their way through a section, the castings can be screened out.Vermicomposting requires high moisture content in the mix and mild temperatures to create a suitable habitat for the worms. Red worms, the most commonly used, cannot tolerate temperatures lower than 33 degrees or higher than 96 degrees Fahrenheit and this type of system is not commonly found outdoors in areas where freezing temperatures occur.

Unlike conventional composting, the organic material does not reach high temperatures. Depending upon the final use of the compost, additional heating and/or drying steps may be required. There are also pile size limitations to this method. Piles should be no higher than 2-3 feet, though widths are limited by system design. Again, there are varying degrees of sophistication with this composting system-anywhere from single units designed for home use to large scale industrial systems utilizing multiple rows of insulated units equipped with shredders, screens, heating, cooling and ventilation capable of processing up to a ton or more of organic materials per day.

According to the latest Maine Waste Management and Recycling Plan (June 1998) 140 communities have instituted bans on the disposal of leaves and yard trimmings with their municipal solid waste. Currently, there are 35 centralized municipal leaf and yard waste programs in operation in Maine. We hope this guide will stimulate more towns to consider the composting option.

We encourage programs that have established successful track records in managing leaf and yard trimmings to think about taking their composting programs to the next stage and adding other source separated organics to their mix. Good examples would be certain kinds of food wastes and fish processing wastes. Food discards comprise as much as 25% of the residential waste stream as compared to 13-14% for leaf and yard trimmings. Such a move would require additional regulatory review and monitoring, but would provide an alternative management option at a potentially lower cost than other disposal methods currently available. For assistance on composting these and other materials, please see the Appendix listings below

Appendix A

TECHNICAL ASSISTANCE :Statewide

The following Maine professionals offer composting technical assistance to individuals wishing to develop compost facilities:

Technical Assistance:

Mark King: Environmental Specialist, Team Leader for the **Maine Compost School**
Maine Department of Environmental Protection
Bureau of Remediation and Waste Management
Solid Waste Division.
17 State House Station, Augusta, ME 04333
Tel. (207) 287-2430
Cell phone: 592-0455
Fax (207) 287-7826
E mail: Mark.A.King@maine.gov

George MacDonald: Program Manager,
Maine State Planning Office
Waste Management and Recycling Program
38 State House Station, Augusta, ME 04333-0038
Tel. (207) 287-5759
Fax (207) 287-5756
E mail: George.MacDonald@maine.gov

Sam Morris: Senior Planner
Maine State Planning Office
Waste Management and Recycling Program
38 State House Station, Augusta, ME 04333-0038
Tel. (207) 287-8054
Fax (207) 287-5756
E mail: sam.morris@maine.gov

Dr. Bill Seekins: Composting and By-product Utilization Specialist,
Maine Department of Agriculture, Food, and Rural Resources
Office of Agricultural, Natural, and Rural Resources
28 State House Station, Augusta, ME 04333
Tel. (207) 287-1132
Fax (207) 287-7548-5576
E mail: Bill.Seekins@maine.gov

Maine Compost School
See Dr. Bill Seekins listing above; also

Mark Hutchinson: Cooperative Extension Service
235 Jefferson St.
PO Box 309
Waldoboro, ME 04572-0309
Phone: 207-832-0343 OR 1-800-244-2104
Fax: 207-832-0377
E-mail: markh@umext.maine.edu

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Remediation & Waste Management
17 State House Station
Augusta, ME 04333-0017
Phone: 207-287-7688 OR 1-800-452-1942
Fax: 287-7826

Augusta Region
See Mark King listing above

Bangor Region
Rick H. Haffner
Phone: 207-941-4331
E-mail: Rick.H.Haffner@maine.gov

Portland Region
Mike Clark
Phone: 207-822-6341
E-mail: Michael.S.Clark@maine.gov

Presque Isle Region
Lou S. Pizzuti
Phone: 207-764-0477
E-mail: lou.s.pizzuti@maine.gov

TECHNICAL ASSISTANCE: Regional

Androscoggin Region.
Carol Fuller: Environmental Planner,
Androscoggin Valley Council of Governments
125 Manley Road
Auburn, ME 04210
Tel. (207) 783-9186
Fax (207) 783-5211
E mail: cfuller@avcog.org

Hancock County.
Sherry Churchill: Environmental Planner,
Hancock County Planning Commission
395 State Street, Ellsworth, ME 04605
Tel. (207) 667-7131
Fax (207) 667-2099
E mail: schurchill@hcpc.org

Kennebec Region.
Sarah Flaks: Environmental Planner,
Kennebec Valley Council of Governments
17 Main St. Fairfield, ME 04937
Tel. (207) 453-4258
Fax (207) 453-4264
E mail: sflaks@kvcog.org

Penobscot, Piscataquis, Knox, Hancock, and Washington Counties.
Greg Lounder: Environmental Planner/ Staff for the Municipal Review Committee,
Eastern Maine Development Corp. PO Box 2579, Bangor, ME 04401
Tel. (207) 942-6389
Fax (207)942-3548
E mail: glounder@emdc.org

Aroostook County:
Connie Bondeson: Environmental Planner,
Nothern Maine Development Commission
PO Box 779 Caribou, ME 04736
Tel. (207) 498-8736
Fax (207) 493- 3108
E mail: cbondeson@nmdc.org

Cumberland County
Neal Allen
Greater Portland Council of Governments
68 Marginal Way, 4th Floor. Portland, ME 04101
207-774-9891; Toll-free 1-800-649-1304
207-774-7149
nallen@gpcog.org

Southern Maine:
Southern Maine Regional Planning Commission
PO Box Q, Sandford, ME 04073
Tel. (207) 324-2952
Fax (207) 324-2958
E mail: info@smrpc.org

Washington County
Judith C. East, Principal Planner
Washington County Council of Governments
PO Box 631 Calais ME 04619
Street address: City Building - 11 Church St.
FAX 454-2568 Tel: 207-454-0465
Toll free: 1-888-287-3006

UNIVERSITY OF MAINE COOPERATIVE EXTENSION (UMCE)
Administrative Offices
5741 Libby Hall
Orono, ME 04469-5741
Phone: 207-581-3188 OR 1-800-287-0274 (in Maine)
Fax: 207-581-1387

County Offices

Androscoggin and Sagadahoc Counties
133 Western Ave.
Auburn, ME 04210-4927
Phone: 207-786-0376 OR 1-800-287-1458
Fax: 1-800-924-7508
E-mail: andsag@umext.maine.edu

Aroostook County Offices
13 Hall St.
Fort Kent, ME 04743-1126
Phone: 207-834-3905 OR 1-800-287-1421
Fax: 207-834-3906
E-mail: cesnas@umext.maine.edu

Houlton Road
PO Box 727
Presque Isle, ME 04769-0727
Phone: 207-764-3361 OR 1-800-287-1462
Fax: 207-764-3362
E-mail: cescas@umext.maine.edu

Central Building
PO Box 8
Houlton, ME 04730-0008
Phone: 207-532-6548 OR 1-800-287-1462
Fax: 207-532-6549
E-mail: cessas@umext.maine.edu

Cumberland County
PO Box 9300
15 Chamberlain Ave.
Portland, ME 04104-9300
Phone: 207-780-4205 OR 1-800-287-1471
Fax: 207-780-4382
E-mail: cescmb@umext.maine.edu

Knox and Lincoln Counties
235 Jefferson St.
PO Box 309
Waldoboro, ME 04572-0309
Phone: 207-832-0343 OR 1-800-244-2104
Fax: 207-832-0377
E-mail: markh@umext.maine.edu

Oxford County
9 Olson Road
South Paris, ME 04281-6402
Phone: 207-743-6329 OR 1-800-287-1482
Fax: 207-743-0373
E-mail: cesox@umext.maine.edu

Penobscot County
307 Maine Ave.
Bangor, ME 04401-4331
Phone: 207-942-7396 OR 1-800-287-1485
Fax: 207-942-7537
E-mail: cespen@umext.maine.edu

Piscataquis County
59 E. Main St.
Dover-Foxcroft, ME 04426-1396
Phone: 207-564-3301 OR 1-800-287-1491
Fax: 1-800-287-1491
E-mail: cespsq@umext.maine.edu

Somerset County
Norridgewock Ave.
RR1, Box 4734
Skowhegan, ME 04976-9734
Phone: 207-474-9622 OR 1-800-287-1495
Fax: 207-474-0374
E-mail: cessom@umext.maine.edu

Franklin County
145A Main St.
Farmington, ME 04938-1729
Phone: 207-778-4650 OR 1-800-287-1478
Fax: 1-800-287-1478
E-mail: cesfrk@umext.maine.edu

Hancock County
63 Boggy Brook Road
Ellsworth, ME 04605-9540
Phone: 207-667-8212 OR 1-800-287-1479
Fax: 207-667-2003
E-mail: ceshnk@umext.maine.edu

Kennebec County
125 State St., 3rd Floor
Augusta, ME 04330-5692
Phone: 207-622-7546 OR 1-800-287-1481
Fax: 207-621-4919
E-mail: cesken@umext.maine.edu

Waldo County
RR4, Box 4645
Belfast, ME 04915-9627
Phone: 207-342-5971 OR 1-800-287-1426
Fax: 1-800-924-4909
E-mail: ceswal@umext.maine.edu

Washington County
11 Water St.
Machias, ME 04654-1017
Phone: 207-255-3345 OR 1-800-287-1542
Fax: 207-355-6118
E-mail: ceswsh@umext.maine.edu

York County
RR2, Box 1678
Sanford, ME 04073-9502
Phone: 207-324-2814 OR 1-800-287-1535
Fax: 207-324-0817
E-mail: cesyrk@umext.maine.edu

Publications

Composting for Municipalities, Planning and Design Considerations
Editor: Mark Dougherty. Natural Resource, Agriculture and Engineering Service, 152 Riley - Robb Hall, Cooperative Extension, Ithaca, NY. 14853-5701. 1998,

The Art and Science of Composting
Editied by the Staff of Biocycle. JG Press, Emmaus, Pennsylvania. 1991. 270 pages.

Yard Waste Composting
Editied by the staff of Biocycle. JG Press, Emmaus, Pennsylvania, 1989. 197 pages.

On Farm Composting Handbook
Editor: Robert Rink. Natural Resource, Agriculture, and Engineering Service, 152 Riley - Robb Hall, Cooperative Extension, Ithaca, NY 14853-5701 1992. 186 pages. (NRAES publication #54)

Municipal Leaf and Yard Waste Composting
Coordinated by Nancy E. Adams. University of New Hampshire Cooperative Extension, PO Box 200 Epping, NH 03042. 1993. 44 pages. *Heavily Appended, includes glossary.*

Keep It Off the Curb
Harmonious Technologies. PO Box 1865, Ojai, CA 93024. 1994. 218 pages. *A manual for managing a home compost program.*

Field Guide to On-Farm Composting
Editor: Mark Dougherty. Natural Resource, Agriculture, and Engineering Service, Cooperative Extension 152 Riley-Robb Hall, Ithaca, New York 14853-5701 1999. 118 pages. (NRAES publication #114)
Field Guide format, plastic coated pages.

Useful Web Site Links

The Compost School *www.composting.org*

Cornell Composting: *www.cals.cornell.edu/dept/compost*

The U.S. Composting Council *www.compostingcouncil.org*

The Composting Council of Canada *www.compost.org*

Composting: EPA *www.epa.gov/epaoswer/non-hw/compost/index.h™*

Food Waste Reduction:*www.epa.gov/epaoswer/non-hw/reduce/food/food.h™*

Waste Management and Recycling Program, Maine State Planning Office *www.state.me.us/spo/wm&r/wmhome.h™*

California Integrated Waste Management Board *www.ciwmb.ca.gov/organics*

The Compost Resource Page *www.oldgrowth.org/compost/*

The University of Maine Cooperative Extension www.umext.maine.edu/

Laboratory Testing Services

Woods End Research Laboratory
Old Rome Rd. Rt. 2 Box 1850,
Mt. Vernon, ME 04352; (207) 293-2457 / fax(207) 293-2488
Email: wbrinton@woodsend.org also info@woodsend.org
Www.maine.com/woodsend.

Contact your local Cooperative Extension Office

COMPANY NAME	LOCATION	ADDRESS	CONTACT	TELEPHONE
ACTON, TOWN OF	ACTON	BOX 540, ACTON, ME 04001-	RICHARD NEAL,	(207)636-3839
ATS ID 15182 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF AND YARD WASTE		
AROOSTOOK RESEARCH FARM MAFES	PRESQUE ISLE	59 HOULTON RD, PRESQUE ISLE, ME 04769-	BROWN,	(207)762-8281
ATS ID 30320 LIC TYPE:	STATUS: Active	DESCRIPTION: PBR FOR COMPOSTING		
AUGUSTA, CITY OF	AUGUSTA	16 CONY STREET, AUGUSTA, ME 04330-	LESLEY JONES	(207)626-2365
ATS ID 14716 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAVES AND FOOD		
BAR HARBOR WWTP	BAR HARBOR	93 COTTAGE STREET, BAR HARBOR, ME 04609-	ROBERT KANE	(207)288-4028
ATS ID 23909 LIC TYPE:	STATUS: Active	DESCRIPTION: STATIC AERATED PILE: SEWAGE SLUDGE AT HULLS COVE COMPOST FACILITY		
BARTLETT FARM SERVICES INC	ELIOT	66 BRIXHAM ROAD, ELIOT, ME 03903-		(207)439-3083
ATS ID 15048 LIC TYPE:	STATUS: Active	DESCRIPTION: INDOOR WINDROW: BONE GEL, PAPER, YARDWASTE		
BATH, CITY OF	BATH	55 FRONT STREET, BATH, ME 04530-	LEINER, LEE	(207)443-8330
ATS ID 49951 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: COMPOSTING FACILITY/PBR/WOOD, LEAF & YARD WASTES		
BATSON, ELLIOT	ADDISON	444 EASTSIDE RD, ADDISON, ME 04606-	BATSON, ELLIOT	(207)483-4081
ATS ID 28038 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: FISH & SEAFOOD (RENEWAL)		
BEAR RIVER EXCAVATION INC	BETHEL	367 BEAR RIVER RD, NEWRY, ME 04261-	DUBOIS, TOM	(207)824-2879
ATS ID 50914 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: COMPOSTING FACILITY-WOOD LEAF & YARD WASTES PBR		
BELGRADE, TOWN OF	BELGRADE	6 MANCHESTER RD, BELGRADE, ME 04917-	SIMPSON, BOB	(207)495-2258
ATS ID 24479 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAVES AND VEGETATIVE WASTE		
BERRY'S SEPTIC SERVICE	BUCKSPORT	PO BOX H, BUCKSPORT, ME 04416-	BOWIE, GERALD	(207)469-7702
ATS ID 47705 LIC TYPE:	STATUS: Active	DESCRIPTION: STATIC AERATED COMPOSTING OF TYPE II BIOSOLIDS, DEWATERED SEPTAGE & FISH WASTE		
BOOTHBAY REGION REFUSE DD	BOOTHBAY	PO BOX 105, BOOTHBAY, ME 04537-	MCCRADY,	(207)633-5006
ATS ID 14128 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF AND YARD WASTE		
BRUNSWICK, TOWN OF	BRUNSWICK	INDUSTRY ROAD, BRUNSWICK, ME 04011-	STEVE	(207)725-6654
ATS ID 14843 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF AND YARD WASTE		
BUCKSPORT, TOWN OF	BUCKSPORT	P.O. DRAWER X, BUCKSPORT, ME 04416-	RAYMOND,	(207)469-7368
ATS ID 15484 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF/YARD WASTE		
CHERRYFIELD FOODS INC	CHERRYFIELD	P.O. BOX 128, CHERRYFIELD, ME 04622-	REYNOLDS,	(207)546-7573
ATS ID 15561 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: FOOD WASTE		

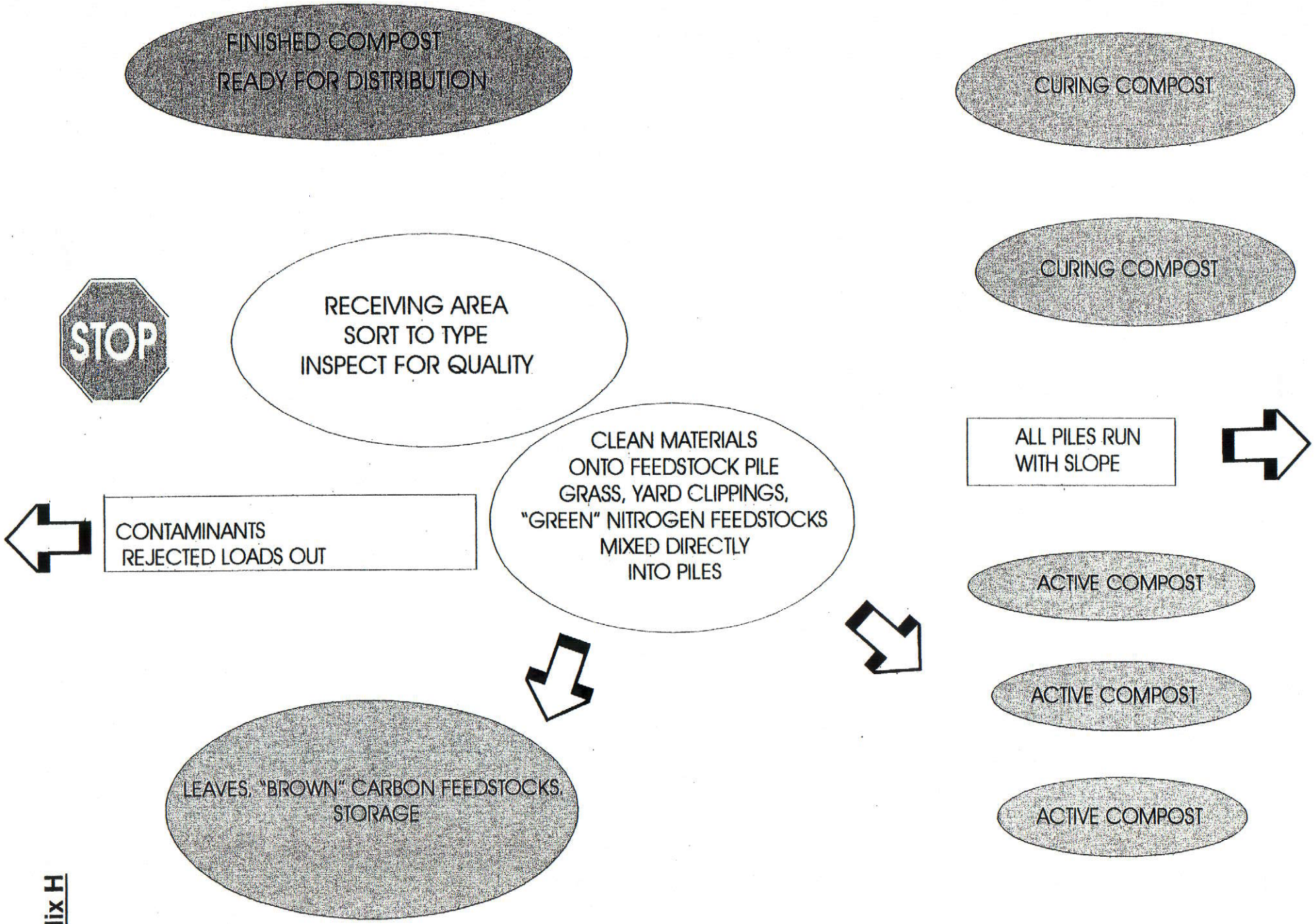
COMPANY NAME	LOCATION	ADDRESS	CONTACT	TELEPHONE
COMMERCIAL RECYCLING SYSTEMS	SCARBOROUGH	2 GIBSON RD, SCARBOROUGH, ME 04074-	GLEASON, DOUG	(207)883-3325
ATS ID 35815 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: PBR/COMPOSTING FACILITY-WOOD, LEAF & YARD WASTES		
DOUG GOTT AND SONS INC	TREMONT	HCR 33 BOX 320, SOUTHWEST HARBOR, ME 04679-	TIMOTHY GOTT	(207)244-7461
ATS ID 24021 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: CRAB PROCESSING WASTE AND SAWDUST		
DUBOIS LIVESTOCK	ARUNDEL	23 IRVING RD, ARUNDEL, ME 04046-	FRICK, ALBERT	(207)282-0323
ATS ID 30528 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: FISH WASTE & HORSE MANURE		
ELIOT, TOWN OF	ELIOT	141 STATE ROAD, ELIOT, ME 03903-	ORLAND	(207)439-9451
ATS ID 24022 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: LEAVE, GRASS AND GARDEN WASTES		
EMR INC	SOUTHWEST HARBOR	PO BOX 787, SOUTHWEST HARBOR, ME 04679-078	WORCESTER III,	(207)244-9033
ATS ID 24393 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROWS: CRAB WASTE		
FITZPATRICK, DONALD	HOULTON	RFD 1 BOX 332, HOULTON, ME 04730-		(207)532-7508
ATS ID 28248 LIC TYPE:	STATUS: Active	DESCRIPTION: PBR COMPOST SITE TYPE 1 CULLED POTATOES		
FREEDOM FARM	BRUNSWICK	266 CASCO RD, BRUNSWICK, ME 04011-	BROOKS, GARY	(207)729-1534
ATS ID 48411 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: COMPOSTING FACILITY/WOOD, LEAF, & YARD WASTES/PBR		
H SMITH PACKING CORP	WESTFIELD	55 NORTH ST SUITE C, PRESQUE ISLE, ME 04769-	SMITH, GREG	(207)764-4540
ATS ID 15075 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: CULL POTATOES/SAWDUST/COVER MATERIAL/ASH		
HALFORD, JOYCE	HARTLAND	596 ATHENS RD, HARTLAND, ME 04943-		(207)938-2336
ATS ID 29776 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: TYPE 1A COMPOSTING FACILITY-OPEN WINDROW		
HAWK RIDGE COMPOST FACILITY	UNITY TWP	RFD 1 BOX 1682, UNITY, ME 04988-1682	HARRIS	(207)846-3737
ATS ID 14363 LIC TYPE:	STATUS: Active	DESCRIPTION: INVESSEL COMPOST FACILITY: SEWAGE SLUDGE		
INTERSTATE SEPTIC SYSTEMS INC	ROCKLAND	10 GORDON DR, ROCKLAND, ME 04841-	ELAINE HARRIS	(207)354-6310
ATS ID 15293 LIC TYPE:	STATUS: Active	DESCRIPTION: AGITATED BIN: SEPTAGE, FOOD, FISH		
J & L COMPOST	WASHINGTON	341 YOUNGS HILL RD, WASHINGTON, ME 04574-	JONES, FRANK	(207)845-2391
ATS ID 24618 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: FISH AND SEAFOOD PROCESSING WASTE		
JAY, TOWN OF	JAY	99 MAIN STREET, JAY, ME 04239-	MARK HOLT	(207)897-6785
ATS ID 15239 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF AND YARD WASTE		
KAY-BEN FARM	GORHAM	54 PLUMMER ROAD, GORHAM, ME 04038-	BENSON,	(207)892-6446
ATS ID 33885 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW COMPOST -SAWDUST, MANURE & SEAFOOD RESIDUALS		

COMPANY NAME	LOCATION	ADDRESS	CONTACT	TELEPHONE
KENNEBUNKPORT WWTP	KENNEBUNKPORT	PO BOX 1038, KENNEBUNKPORT, ME 04046-0566	ALLAN MOIR	(207)967-4243
ATS ID 20412 LIC TYPE:	STATUS: Active	DESCRIPTION: STATIC AERATED PILE: SEWAGE SLUDGE & ASH		
KINGFIELD, TOWN OF	KINGFIELD	RR 1 BOX 1585, KINGFIELD, ME 04947-	MOODY, WESLEY	(207)265-4640
ATS ID 34173 LIC TYPE:	STATUS: Active	DESCRIPTION: STATIC AERATED PILE: DEWATERED SEPTAGE, FOOD, ETC.		
KITTERY, TOWN OF	KITTERY	PO BOX 808, KITTERY, ME 03904-0808	ROSSITER,	(207)439-4646
ATS ID 23369 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF AND YARD WASTE		
KNOX RIDGE HOLSTEIN FARM	THORNDIKE	RR 2, BOX 740, THORNDIKE, ME 04986-	ELLIS, DAVID	(207)568-3683
ATS ID 26505 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: FOOD WASTE		
LAND & SEA COMPOST	ROCKPORT	62 MEADOW ST, ROCKPORT, ME 04856-	SMITH, CHRIS	(207)236-4147
ATS ID 29059 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW FACILITY/LEAF, YARD WASTE, FISH & MANURE		
LEWISTON-AUBURN WPCA	AUBURN	PO BOX 1928, LEWISTON, ME 04241-1928	ROBERT	(207)782-0917
ATS ID 15150 LIC TYPE:	STATUS: Active	DESCRIPTION: AGITATED BIN: SEWAGE SLUDGE		
LINCOLN COUNTY RECYCLING	WISCASSET	PO BOX 249, WISCASSET, ME 04578-	SILVA, GERALD R	(207)882-5276
ATS ID 35753 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: COMPOSTING FACILITY-LEAF & YARD WASTE		
LINCOLN SANITARY DIST	LINCOLN	PO BOX 56, LINCOLN, ME 04457-	WOOLEY,	(207)794-8244
ATS ID 14438 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: SEWAGE SLUDGE		
LITTLE RIVER TURF FARM	LISBON	P O BOX 148, LISBON FALLS, ME 04252-	MARK GODDARD	(207)353-2810
ATS ID 28670 LIC TYPE:	STATUS: Active	DESCRIPTION: STATIC AERATED FACILITY: SEWAGE SLUDGE & AMENDMENTS		
MID MAINE SOLID WASTE ASSOC	CORINNA	PO BOX 68, DEXTER, ME 04930-	SILVERMAN,	(207)924-3650
ATS ID 27246 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF & YARDWASTE		
MILLINOCKET, TOWN OF	MILLINOCKET	197 PENOBSCOT AVENUE, MILLINOCKET, ME 04462-		(207)723-9701
ATS ID 15461 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF AND YARD WASTE		
NEST & SONS INC	KENNEBUNK	723 ALEWIVE ROAD, KENNEBUNK, ME 04043-	FRICK, ALBERT	(207)985-2581
ATS ID 34003 LIC TYPE:	STATUS: Active	DESCRIPTION: STATIC AERATED PILE: REDUCED PROCEDURE-DEWATERED SEPTAGE, GRASS FROM SEPTAGE		
NEWCOMB, GREGORY S	PERRY	BOX 148 SOUTH MEADOW RD, PERRY, ME 04667-	NEWCOMB,	(207)853-4851
ATS ID 30325 LIC TYPE:	STATUS: Active	DESCRIPTION: PBR WINDROW COMPOSTING:FISH SCALES		
NEWPORT, TOWN OF	NEWPORT	31 WATER ST, NEWPORT, ME 04953-	LOGUE, EDWARD	(207)368-5575
ATS ID 27895 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: TYPE 1A COMPOST FACILITY		

COMPANY NAME	LOCATION	ADDRESS	CONTACT	TELEPHONE
NORTHERN KATAHDIN VALLEY WASTE	DYER BROOK	146 DYER BROOK RD, ISLAND FALLS, ME 04747-	HORTON,	(207)757-8700
ATS ID 25925 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: TURNED PILE: YARD AND LEAF WASTE		
OAKLAND, TOWN OF	OAKLAND	P.O. BOX 187, OAKLAND, ME 04963-	QUINN, ROBERT	(207)465-7357
ATS ID 25837 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF AND YARD WASTE		
OLD ORCHARD BEACH, TOWN OF	OLD ORCHARD BEACH	1 PORTLAND AVENUE, OLD ORCHARD BEACH, ME 04064-	BRAUN, TIMOTHY	(207)934-2550
ATS ID 49741 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: COMPOST FACILITY-WOOD, LEAF & YARD WASTES-PBR		
OLD TOWN(PUBLIC WORKS DEPT), CITY OF	PENOBSCOT	150 BRUNSWICK, OLD TOWN, ME 04468-	BIXBY, HOLLY	(207)827-3974
ATS ID 28678 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: LEAF & YARD WASTE COMPOST- WINDROW METHOD		
OLD TOWN, CITY OF	OLD TOWN	150 BRUNSWICK, OLD TOWN, ME 04468-1497	GARY STETSON	(207)827-3961
ATS ID 24420 LIC TYPE:	STATUS: Active	DESCRIPTION: STATIC AERATED PILE: SEWAGE SLUDGE		
PARIS UTILITY DIST	PARIS	PO BOX 154, SOUTH PARIS, ME 04281-	BARLOW, JOHN	(207)743-6251
ATS ID 48347 LIC TYPE:	STATUS: Active	DESCRIPTION: COMPOST FACILITY/REDUCED PROCEDURE/STATIC AERATED PILE		
PROSSER, PAUL	HUDSON	16 PROSSER ROAD, HARPSWELL, ME 04079-	PROSSER, PAUL	(207)725-5753
ATS ID 31683 LIC TYPE:	STATUS: Active	DESCRIPTION: OPEN WINDOW COMPOSTING: FISH WASTE		
REGIONAL WASTE SYSTEMS	SOUTH PORTLAND	64 BLUEBERRY ROAD, PORTLAND, ME 04102-		(207)773-6465
ATS ID 14500 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF AND YARD WASTE		
RICKER FARM	LISBON	60 RIDGE STREET, LISBON, ME 04250-	RICKER, WAYNE	(207)353-4513
ATS ID 24159 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAVES, VEGETATIVE, AND FOOD WASTE		
RID INC	WEST BATH	64 AJ RENO SR. RD, WEST BATH, ME 04530-	GEORGE M.	(207)443-3217
ATS ID 15036 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF AND VEGETATIVE WASTE		
ROBINSON MFG CO	OXFORD	PO BOX 195, OXFORD, ME 04270-	JON HART	(207)539-4481
ATS ID 14698 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: WOOL (TEXTILE) SLUDGE		
RUMFORD-MEXICO SEWERAGE DIST	MEXICO	P.O. BOX 160, RUMFORD, ME 04276-	GREG TRUNDY	(207)364-7225
ATS ID 13547 LIC TYPE:	STATUS: Active	DESCRIPTION: STATIC AERATED PILE: SEWAGE SLUDGE		
SAINT GEORGE, TOWN OF	ST GEORGE	PO BOX 131, TENANTS HARBOR, ME 04860-	FALLA, JOHN M.	(207)372-6363
ATS ID 36709 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: COMPOSTING FACILITY PBR WOOD/LEAF/YARD WASTES		
SCARBOROUGH SANITARY DIST	SCARBOROUGH	415 BLACK POINT ROAD, SCARBOROUGH, ME 04074-	KEN WELSH	(207)883-4663
ATS ID 13522 LIC TYPE:	STATUS: Active	DESCRIPTION: STATIC AERATED PILE: SEWAGE SLUDGE		

COMPANY NAME	LOCATION	ADDRESS	CONTACT	TELEPHONE
SCOVILLE, TIMOTHY R	LUBEC	RD 2 BOX 1135, LUBEC, ME 04652-	SCOVILLE, TIM	(207)733-2351
ATS ID 31218 LIC TYPE:	STATUS: Active	DESCRIPTION: OPEN WINDROW COMPOSTING: FISH WASTE		
SKOWHEGAN, TOWN OF	SKOWHEGAN	225 WATER STREET, SKOWHEGAN, ME 04976-	DORE,	(207)474-6911
ATS ID 47755 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: PBR COMPOSTING FACILITY-WOOD, LEAF & YARD WASTES		
SOIL PREPARATION INC	PLYMOUTH	PO BOX 148, PLYMOUTH, ME 04969-0158	FROST,	(207)848-5405
ATS ID 26016 LIC TYPE:	STATUS: Active	DESCRIPTION: AGITATED BIN: SEPTAGE, SLUDGE, FOOD WASTE		
SOUTH BERWICK, TOWN OF	SOUTH BERWICK	180 MAIN STREET, SOUTH BERWICK, ME 03908-0236	ST. PIERRE, JON	(207)384-2263
ATS ID 24250 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF AND YARD WASTE		
SOUTH PORTLAND, CITY OF	SOUTH PORTLAND	PO BOX 9422, SOUTH PORTLAND, ME 04106-9422	JOHNSON,	(207)767-3201
ATS ID 35801 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: PBR COMPOSTING FACILITY-WOOD LEAF & YARD WASTES		
ST ONGE, ROBERT L	LYMAN	100 NOT A ROAD, LYMAN, ME 04002-		(207)499-7886
ATS ID 29629 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW COMPOSTING: FISH WASTE		
STONINGTON, TOWN OF	STONINGTON	PO BOX 9, STONINGTON, ME 04681-		(207)367-2351
ATS ID 15270 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: YARD WASTE		
STRAW'S FARM	NEWCASTLE	30 BRICK HILL ROAD, NEWCASTLE, ME 04553-	STRAW, LEE OR	(207)882-6875
ATS ID 32938 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW PROCESS: FISH AND WOODWASTE		
UNIVERSITY OF MAINE - ORONO	OLD TOWN	107 MAINE AVE, BANGOR, ME 04401-	DYER, JAKE	(207)973-3336
ATS ID 29712 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: LEAF & YARD WASTE, CAFETERIA FOOD, MANURE		
VEAZIE, TOWN OF	VEAZIE	1084 MAIN STREET, VEAZIE, ME 04401-	GERALD S.	(207)947-2781
ATS ID 15199 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: WINDROW: LEAF AND YARD WASTE		
WALTER LAMONT JR	MONTVILLE	RR 2 BOX 475, SEARSMONT, ME 04973-		(207)342-4042
ATS ID 26365 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: SEA URCHIN PROCESSING WASTE		
WASHINGTON COUNTY COMMISSIONERS	MACHIAS	PO BOX 279, MACHIAS, ME 04654-	FREY, JEFF	(207)255-3127
ATS ID 30988 LIC TYPE:	STATUS: Active	DESCRIPTION: EXPANSION:WINDROW- BLUEBERRY, SALMON AND OTHER MARINE WASTES		
WEBB, RONALD	PITTSTON	RR 2 BOX 73, GARDINER, ME 04345-		(207)582-5595
ATS ID 26674 LIC TYPE:	STATUS: Active	DESCRIPTION: WINDROW: MUSSEL WASTE UP TO 2,000 YD/YR		
WEST GARDINER, TOWN OF	WEST GARDINER	318 SPEARS CORNER RD, WEST GARDINER, ME 04345-	GOODWIN SR,	(207)724-3945
ATS ID 50852 LIC TYPE: TYPE IA	STATUS: Active	DESCRIPTION: COMPOSTING FACILITY-PBR WOOD, LEAF & YARD WASTES		

COMPANY NAME	LOCATION	ADDRESS	CONTACT	TELEPHONE
WHITE BUFFALO FOREST	GOULDSBORO	PO BOX 95, GOULDSBORO, ME 04607-	DUERR, RICK	(207)963-7326
ATS ID 15485 LIC TYPE: STATUS: Active	DESCRIPTION: WINDROW: FISH PROCESSING WASTE (SEA URCHINS,SEA CUCUMBERS)			
WILTON WWTP	WILTON	PO BOX 541, WILTON, ME 04294-0541	RUSS MATHERS	(207)645-3682
ATS ID 15422 LIC TYPE: STATUS: Active	DESCRIPTION: STATIC AERATED PILE: SEWAGE SLUDGE			
YARMOUTH WWTP	YARMOUTH	200 MAIN STREET, YARMOUTH, ME 04096-	TOM CONNELLY	(207)846-2415
ATS ID 13517 LIC TYPE: STATUS: Active	DESCRIPTION: COMPOST SITE RENEWAL: WINDROW COMPOSTING OF SEWAGE SLUDGE			
YARMOUTH, TOWN OF	YARMOUTH	P.O. BOX 907, YARMOUTH, ME 04096-	TOM CONNELLY	(207)846-4971
ATS ID 15271 LIC TYPE: TYPE IA STATUS: Active	DESCRIPTION: WINDROW: YARD WASTE			
YORK, TOWN OF	YORK	186 YORK STREET, YORK, ME 03909-1314	MARK GREEN	(207)363-1000
ATS ID 34249 LIC TYPE: TYPE IA STATUS: Active	DESCRIPTION: PBR FOR COMPOSTING OF WOOD, LEAF, AND YARD WASTES			


FINISHED COMPOST
READY FOR DISTRIBUTION
CURING COMPOST
CURING COMPOST
STOP
RECEIVING AREA
SORT TO TYPE
INSPECT FOR QUALITY
ALL PILES RUN
WITH SLOPE
CONTAMINANTS
REJECTED LOADS OUT
CLEAN MATERIALS
ONTO FEEDSTOCK PILE
GRASS, YARD CLIPPINGS,
"GREEN" NITROGEN FEEDSTOCKS
MIXED DIRECTLY
INTO PILES
ACTIVE COMPOST
ACTIVE COMPOST
ACTIVE COMPOST
LEAVES, "BROWN" CARBON FEEDSTOCKS,
STORAGE

Appendix H